Sept 15th

max path sum

```
   + 3 +
  7   4            10  7
2   4   5        2   4   5     12 max(10+4,7+4) 13   | 12  14  13 |  → max on these → 14  (PATH 3,7,4)
```

max (foldleft (triangle, [], lambda(xs, ac) → myfold (xs,ac)))

prior level add 0 to end level 1

prior level add 0 to beginning level 1

element wise map max on both lists

triangle: 2 10 4 7 5

```
 10  7  0            0  10  7
  2  4  5            2   4  5
 ---------          ---------
 12 11  5            2  14 13
```

(12) 11 5
2 (14) (13)

folded level : 12 14 13

WORKFLOW

on TERMINAL → git checkout -b <branch_name>

mkdir <folder_name>

cd <folder_name>

code .

ON VSCODE → set up files

PYTHON NOTES [FILES]

```
f = open("<filename>", 'r')     # read only mode
        PATH_TO_FILE
lines = f.readlines()            # list of lines → use FOR LOOP to parse/iterate

f.close()
```

PYTHON NOTES [STRINGS]

string.split(sep = "<>")

Data Representations

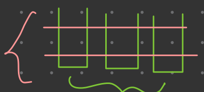
- RECORDS (m dimensional vector as tuple/array) (holds different attributes)
- GRAPHS (nodes connected w/ edges) (adj. matrix or adj. list)
- IMAGES (matrix / list of RGB or grayscale pixel)
- TEXT (list of words)
- STRING (list of characters i.e. DNA/genomic data :))
- Time series (list of data at specific intervals of time)

Types of Learning

- SUPERVISED LEARNING (create a model to allow for predictions) [REGRESSION ; CLASSIFICATION]
- UNSUPERVISED LEARNING (more about the structure of the data) [CLUSTERING]

Data set
[n x m]

n data points



m features

feature space

- all possible values for set of features in our data

COMPARE DATA POINTS

dissimilarity func → returns large number if objects are very dissimilar

DISTANCE IS A SPECIFIC TYPE OF DISSIMILARITY FUNC

d is a distance func iff

- $d(i,j) = 0$ iff $i = j$
- $d(i,j) = d(j,i)$
- $d(i,j) \le d(i,k) + d(k,j)$ (TRIANGLE INEQUALITY)

* WE MAY PREFER TO COMPARE USING A DIST. FUNC → easier to understand + more intuitive

MINKOWSKI DISTANCE

For 2 values x & y in d-dimensional space

$x = [x_1, \cdots x_d]$ $y = [y_1, \cdots y_d]$

Define $p \ge 1$

$$L_p(x,y) = \left(\sum_{i=1}^{d} |x_i - y_i|^p\right)^{\frac{1}{p}}$$

* NOT a dist func if $0 < p < 1$
disprove via counter-example.

EUCLIDEAN DISTANCE

MINKOWSKI DISTANCE w/ $p = 2$

$$L_2(x,y) = \left(\sum_{i=1}^{d} |x_i - y_i|^2\right)^{\frac{1}{2}}$$

MANHATTAN DISTANCE

MINKOWSKI DISTANCE w/ $p = 1$

$$L_1(x,y) = \sum_{i=1}^{d} |x_i - y_i|$$